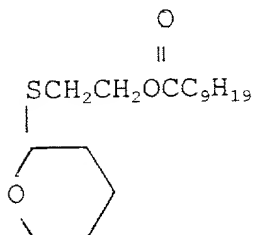


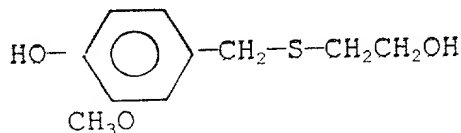
is hydrogen, R^5 is $-\text{CH}_2\text{CH}_3$, and R^1 is hydroxyethyl.

24.



$a = 1$, $m = 0$, $n = 0$; $y = 1$, z is 1; X is oxygen, R^5 and R^7 are joined to form $-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-$; R^4 is hydrogen, and R^1 is decanoyloxyethyl.

25.



$a = 1$, $m = 0$, $n = 0$; $y = 1$, z is 1; X is *p*-hydroxyphenyl, R^4 and R^5 are hydrogen, R^7 is *m*-methoxy, and R^1 is hydroxyethyl.

Homologs of the thus described compounds which are particularly useful in the stabilization of PVC compositions include the 2-S-(tetrahydropyranyl)thioalkyl carboxylates and their furanyl homologs wherein the ethyl moiety is replaced by propyl, butyl, hexyl, and others in the series up to and including dodecyl and the capric acid radical of said compound is replaced by other fatty acid radicals (saturated and unsaturated) or resin acid radicals having up to and including 22 carbon atoms. The acids are exemplified by caproic,

caprylic, lauric, myristic, palmitic, stearic, arachidic, behenic, and the oleic and linoleic acids, as such, or as found in tall oil acids along with abietic and pimaric acids. The mercaptoalkyl carboxylate moiety is thus exemplified by mercaptoethyl laurate, mercaptoethyl oleate, mercaptoethyl hexanoate, mercaptoethyl octanoate, mercaptoethyl myristate, mercaptoethyl palmitate, mercaptoethyl stearate, and the mercaptopropyl, mercaptobutyl, and mercaptooctyl homologs of each of the above. The esters are made by the conventional method of reacting the hydroxyl group of a mercaptoalkanol with the desired carboxylic acid in the presence of an acidic catalyst and removing water as it forms. The 2-S-(tetrahydropyranyl)thioalkanols, the carboxylates thereof, and their furanyl homologs are employed in this invention in an amount sufficient to impart the desired resistance to heat deterioration to halogen-containing organic polymers.

A 2-S-(tetrahydropyranyl)mercaptoalkyl carboxylate is more active as a heat stabilizer in flexible PVC compositions than the tetrahydropyranyl-blocked mercaptans derived from alkylmercaptans such as dodecanethiol when activated according to this invention as manifest in the improved color hold properties and dynamic thermal stability of such stabilized PVC compositions. The higher activity may be the result of the better compatibility of the ester-containing latent mercaptans with a plasticized PVC. The compatibility of the corresponding homologous furan-based latent mercaptans is similar.

It will be readily apparent to one of ordinary skill in the art that the precise amount of stabilizer composition used will depend upon several factors, including, but not limited to, the particular halogen-containing organic polymer

employed, the temperature to which the polymer will be subjected, and the possible presence of other stabilizing compounds. In general, the more severe the conditions to which the halogen-containing organic polymer is subjected, and the longer the term required for resisting degradation, the greater will be the amount of stabilizer composition required.

Generally, as little as about 0.05 phr of the latent mercaptan, by weight of the halogen-containing polymer will be effective and, while there is no critical upper limit to the amount of latent mercaptan which can be employed, an amount of about 4 phr or less is preferred. More preferably, the amount of latent mercaptan is from about 0.1 to about 3 phr.

A preferred halogen-containing polymer composition of this invention will contain from about 0.005 to about 1 phr of the synergistic mixture of zinc carboxylate and zinc chloride, by weight of the polymer, and more preferably, from about 0.005 to about 0.5 phr. Still more preferably, the polymer composition of this invention will contain from about 0.08 to about 0.2 phr of said mixture.

The optimal proportions of zinc carboxylate and zinc chloride in the synergistic mixture will, of course, depend upon whether the halogen-containing polymer composition is rigid, semi-rigid, flexible, transparent, or opaque, the number of carbon atoms in the zinc carboxylate, and the amount and nature of co-stabilizers and other additives. The zinc content of zinc stearate, for example, is about 9% while in zinc octanoate it is about 18.5%. Zinc chloride, on the other hand, contains about 48% zinc. Therefore, the amount of the carboxylate and chloride is expressed for the purposes of this invention in terms of the amount of zinc ion contributed by each. The amount of zinc ion contributed by the zinc